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March 14, 2014

Mr. Charlie Coleman
U.S. EPA, Region VIII
Federal Building
10 West 15th Street
Helena, MT 59626-0096

Subject: Remedial Design Unit (RDU) 10 – Warm Springs Creek Remedial Actions Bull Trout Biological Assessment

Dear Mr. Coleman:

Enclosed please find ten copies of the completed Bull Trout Biological Assessment (BA) for the RDU 10 – Warm Springs Creek Remedial Actions project. In the August 2012 Warm Springs Creek Final Design Report (FDR) it is stated that, "The Remedial Action Work Plan (RAWP) developed for RDU 10 will require consultation with the United States Fish and Wildlife Service (USFWS). Based on their responsibilities under the Endangered Species Act (ESA), the USFWS may be required to complete a Biological Opinion prior to the Remedial Action (RA). This may require the completion of a BA in order for the USFWS to have sufficient data to render the Biological Opinion. Whether a Biological Opinion will be required will be determined by the USFWS upon review of the RAWP."

A letter from R. Mark Wilson of the USFWS to the United States Environmental Protection Agency (USEPA) Region 8 was sent on October 3, 2012, providing a response from the USFWS based on their review of the Final RDU 10-Warm Springs FDR. In this correspondence it is stated that "Section 7(c) of the Endangered Species Act requires that a biological assessment be prepared for any federal action that is a major construction activity to determine the effects of the proposed action on listed and proposed species."

This BA is intended to fulfill Section 7(c) requirements and assess the impacts of the proposed remedial actions associated with the Final RDU 10-Warm Springs Creek on bull trout and other listed species as appropriate. Throughout the process, CDM Smith biologists have coordinated with Dan Brewer (USFWS) to create a BA that is thorough and provides USFWS with sufficient information to quickly complete a Biological Opinion.

Included within the front cover of the BA is a CD that contains a digital copy of the report. A digital copy of the BA will also be made available on an FTP site for individuals who would like to review the BA but did not receive a hard copy. In the next few days, a link will be provided by Gunnar Emilsson (CDM Smith) to access the FTP site.

If you need any additional information regarding the BA or have questions regarding consultation with USFWS please contact me at (703) 691-6467.

Very truly yours,

Matthew E. Petty

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cc: Gunnar Emilsson (CDM Smith)
Murray Wade (CDM Smith)
File

Contract No.: EP-W-05-049

US Environmental Protection Agency Region VIII

Remedial Design Unit (RDU) 10-Warm Springs Creek Remedial Actions – Bull Trout Biological Assessment (BA)

March 2014

Anaconda Regional Water, Waste & Soils Operable Unit
Anaconda Smelter NPL Site
Anaconda, Montana

Prepared for:

U.S. Environmental Protection Agency
Region VIII

CDM Smith

Remedial Action Contract for Remedial, Enforcement Oversight, and Non-Time Critical Removal Activities at Sites of Release or Threatened Release of Hazardous Substances In EPA Region VIII

U.S. EPA Contract No.: EP-W-05-049
Work Assignment No.: 302-NGNG-0818

Remedial Design Unit (RDU) 10-Warm Springs Creek Remedial Actions – Bull Trout Biological Assessment (BA)

Anaconda Regional Water, Waste & Soils Operable Unit
Anaconda Smelter NPL Site
Anaconda, Montana

March 2014

Prepared for:

U.S. Environmental Protection Agency
Federal Building
10 West 15th Street, Suite 3200
Helena, Montana 59626

Prepared by:

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Fairfax, VA 22030

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Section 1

Warm Springs Bull Trout Biological Assessment (BA)

1.1 Introduction

Warm Springs Creek is a fourth-order tributary of the Clark Fork River with a watershed area of 164 square miles. The stream generally flows from west to east and the topography of the drainage basin varies from rugged mountain ridges to gentle valley bottoms with 80 percent of the basin mountainous. During the nearly 100-year operation of ore-processing facilities at Anaconda, Montana, the Warm Springs Creek watershed received large volumes of wastes, including slag, tailings, and contaminated soil. As a result, the Anaconda Co. Smelter and adjacent contaminated areas, including large portions of the Warm Springs Creek watershed, was listed on the Superfund National Priorities List (NPL) on September 8, 1983. Despite the positive effects of extensive remediation efforts over the past 30 years, contaminants of concern (COCs) continue to provide a chronic impact to water quality in the creek and may periodically cause acute impacts when the creek meanders and contaminated stream banks erode. Bank erosion is primarily due to human actions which have resulted in reaches of the channel being unstable with increasing lateral movement and down cutting (CDM 1999).

In the August 2012 Warm Springs Creek Final Design Report (FDR) it is stated that, "The Remedial Action Work Plan (RAWP) developed for Remedial Design Unit (RDU) 10 will require consultation with the United States Fish and Wildlife Service (USFWS). Based on their responsibilities under the Endangered Species Act (ESA), the USFWS may be required to complete a Biological Opinion prior to the Remedial Action (RA). This may require the completion of a biological assessment (BA) in order for the USFWS to have sufficient data to render the Biological Opinion. Whether a Biological Opinion will be required will be determined by the USFWS upon review of the RAWP."

A letter from R. Mark Wilson of the USFWS to Charles Coleman (Anaconda Project Manager) of the United States Environmental Protection Agency (USEPA) Region 8 was sent on October 3, 2012 (USFWS 2012a), providing a response from the USFWS based on their review of the Final RDU 10-Warm Springs Final Design Report. In this correspondence it is stated that "Section 7(c) of the Endangered Species Act requires that a biological assessment be prepared for any federal action that is a major construction activity to determine the effects of the proposed action on listed and proposed species."

This BA is intended to assess the impacts of the proposed remedial actions associated with the Final RDU 10-Warm Springs Creek on bull trout and other listed species as appropriate. RDU 10 includes two specific areas that are being considered for remediation. These are the Section 32 and Lower Warm Springs Creek project areas. These areas are shown on **Figure 1-1**.

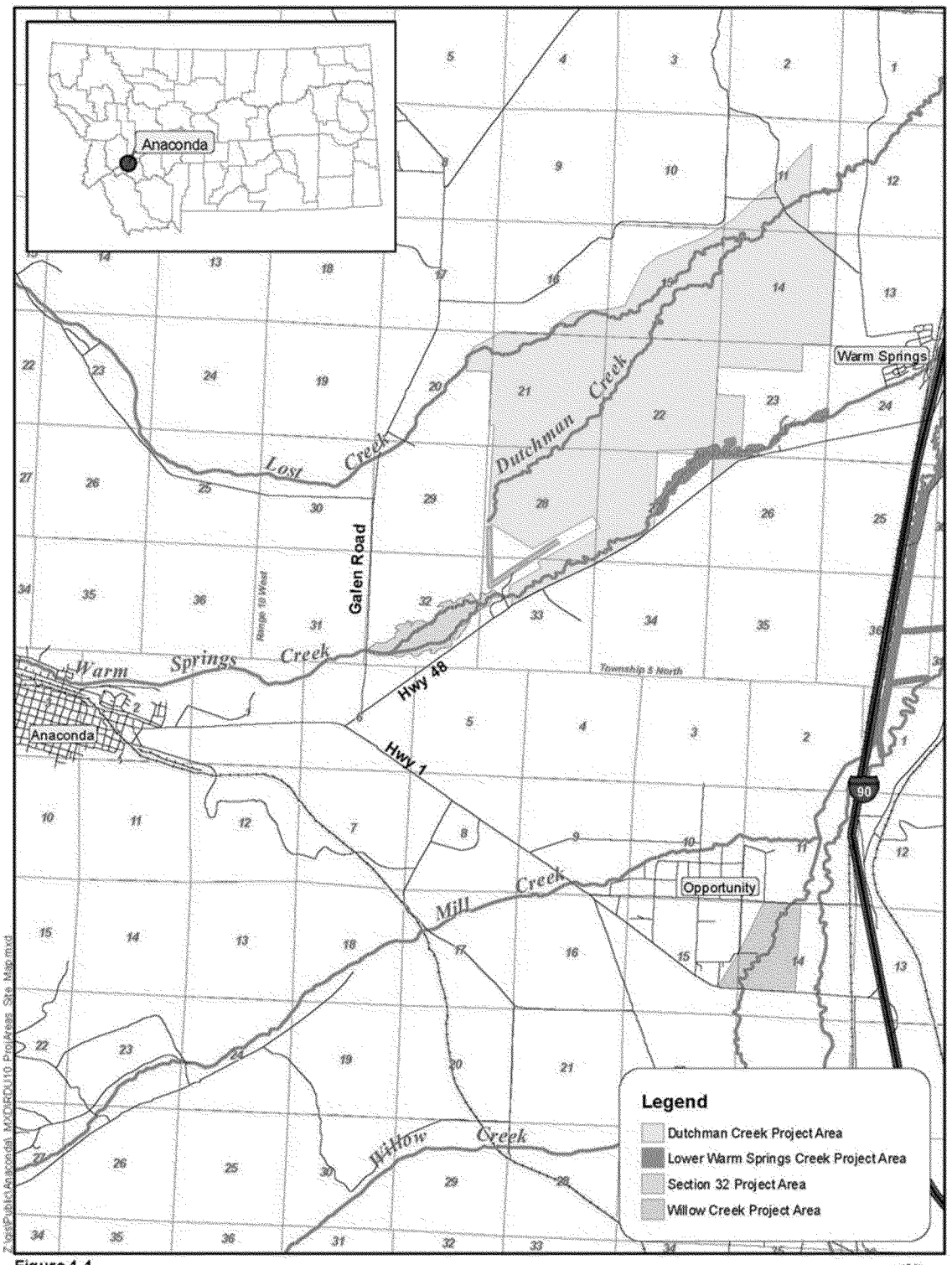


Figure 1-1
RDU 10 Dutchman, Warm Springs and Willow Creeks
Remedial Project Areas - Site Location Map
Anaconda Regional Water, Waste and Soils OU
Anaconda Smelter NPL Site, Montana

1.2 Background/History

The RDU 10 Warm Springs Creek project areas are located at the southern end of the Deer Lodge Valley, near the location of the former Anaconda Minerals Company (AMC) ore processing facilities. The processing facilities at the site were developed to remove copper from ore mined in Butte from about 1884 through 1980. Milling and smelting produced wastes with high concentrations of arsenic, as well as copper, cadmium, lead, and zinc. These contaminants pose potential risks to human health, to life in nearby streams, and to plants and animals in adjacent lands over some 300 square miles. In addition to the millions of cubic yards of tailings, furnace slag, flue dust, and square miles of soil contaminated by airborne wastes, millions of gallons of groundwater have been polluted from wastes and soils. Arsenic and copper are the primary COCs and drive remediation activities (USEPA 2013a).

It is speculated that, in addition to deposition of smelter emissions, a potential source of contamination may have been past diversions from Warm Springs Creek, particularly when the Old Works smelters were in operation in the late 19th Century. Mining and smelting wastes were thought to have been directly discharged into Warm Springs Creek or connected ditches and diversions during the time of the Old Works operations. Irrigation ditches were also constructed to convey flows from Gardner Ditch towards the project area, which is presumed to have conveyed contaminated surface water and mine wastes from Warm Springs Creek (CDM Smith 2012).

In September 1983, the USEPA placed the area surrounding the Anaconda smelter on the Superfund NPL (USEPA 2013a). At that time, USEPA began investigations into the extent of the contamination at the site. This involved consulting with the State of Montana and coordinating with Atlantic Richfield Company (ARCO), who merged with AMC in 1997, and was found to be the potentially responsible party (PRP) at the site. Since 1983, removals and cleanup actions have reduced human health and ecological risks at the site.

The Superfund site is divided into a number of Operable Units (OUs). Two of the OUs, Anaconda Regional Waste Water & Soil and the Old Works/East Anaconda Development Area, are further divided into smaller remedial design units (RDUs). The Warm Springs Creek project areas are located within the Anaconda Regional Waste Water & Soil OU. This OU addresses all remaining issues at the Anaconda Smelter Superfund Site. USEPA signed a Record of Decision (ROD) in 1998 and amended it in 2011 (USEPA 2013a). The OU has been divided into 15 RDUs:

1. Stucky Ridge
2. Lost Creek
3. Smelter Hill Uplands
4. Anaconda Ponds (construction completed)
5. Railroad/Blue Lagoon
6. South Opportunity
7. North Opportunity
8. Opportunity Ponds
9. Fluvial Tailings
10. **Warm Springs Creek**
11. Cashman Concentrate (construction completed)
12. Slag
13. Old Works Groundwater
14. Smelter Hill Facility
15. Mt. Haggin Uplands

Remedial designs have been completed on all the above RDUs except number 3—Smelter Hill Uplands, and remedial action has been initiated on several RDUs. Nearly 10,000 acres have been remediated to date. Construction is expected to be completed over the next 10 years. Long-term monitoring and maintenance, as well as institutional controls, is required (USEPA 2013a).

Further information on cleanup activities at the Anaconda Smelter Superfund Site can be found at the USEPA Region 8 – Superfund – Montana Cleanup Sites – Anaconda Co. Smelter Website (USEPA 2013a).

While it is important to understand the historical background of the area and other completed and on-going remediation activities within the Anaconda Smelter Superfund Site and their potential to affect biological resources within the Warm Springs Creek watershed, this BA focuses on remediation activities for the RDU 10 Warm Springs Creek project areas. The final design for the RDU 10 Warm Springs Creek project areas requires removal of wastes and soil/waste mixtures containing elevated COC concentrations where they are likely causing metals loading to the stream. Wastes removed from Warm Springs Creek and vicinity would be transported to the Opportunity Ponds Waste Management Area (WMA) for disposal. Removal areas would be backfilled with clean fill and soil when necessary. Streams would be realigned into abandoned channels or newly constructed channels, and stream banks would be stabilized with appropriate riparian vegetation according to best management practices (BMPs). These remediation techniques are considered soft engineering approaches. The stream would be further protected by implementing institutional controls such as grazing restrictions or other land use restrictions, and future monitoring and maintenance of the stream and project areas (CDM Smith 2012).

In accordance with section 7(c) of the Endangered Species Act (ESA), the USFWS determined that the following listed threatened, endangered, and candidate species may be present in Deer Lodge County:

Table 1-1 Threatened and Endangered Species that may be present in Deer Lodge County (USFWS 2012a)

Common Name	Scientific Name	Status
Bull Trout	*Salvelinus confluentus*	LT, CH
Wolverine	*Gulo gulo luscus*	C
Whitebark Pine	*Pinus albicaulis*	C

LT – Listed Threatened; CH = Critical Habitat; C=Candidate

The USFWS does not anticipate the wolverine or whitebark pine to occur within the project area (USFWS 2012a). However, bull trout are known to occur in Warm Springs Creek and may occur in the proposed project area (Schreck et. al 2011). In addition, Warm Springs Creek is designated critical habitat for bull trout from the confluence with the Clark Fork River upstream to and including Silver Lake (50 CFR 17, Vol. 75, No. 200, p. 63898-63974).

Other federally-protected species and state species of concern are possible in Deer Lodge County. USFWS does not have site-specific information on these species and has recommended coordination with Montana Fish, Wildlife, and Parks (FWP) to determine the likelihood of presence within the proposed project area. Additional federally-protected species and state species of concern are identified and discussed in Section 3-1.

1.3 Purpose and Need for Biological Assessment

The USFWS listed the Columbia River Distinct Population Segment (DPS) of bull trout as a threatened species under the ESA on June 10, 1998 (Federal Register [FR] 1998). Bull trout occurring in the Clark Fork River and its tributaries, including Warm Springs Creek, are included as subpopulations (now referred to as local populations [USFWS 2002]) in the Columbia River DPS. On November 1, 1999, the USFWS determined threatened status for all populations of bull trout within the conterminous (lower 48) United States. The USFWS proposed the designation of critical habitat and announced the availability of the Bull Trout Draft Recovery Plan for the Columbia River DPS on November 29, 2002. The remediation project areas for this BA fall within designated bull trout critical habitat and are located in the Upper Clark Fork Recovery Subunit (USFWS 2002).

The purpose of the ESA is to conserve threatened and endangered animal and plant species and their ecosystems. As such, Section 7 of the ESA requires federal agencies to ensure that their actions are not likely either to jeopardize the continued existence of threatened or endangered species, or to destroy or adversely modify designated critical habitat that is essential to listed species. In particular, Section 7(c) of the ESA requires that a biological assessment be prepared for any federal action that is a major construction activity to determine the effects of the proposed action on listed and proposed species. In addition, Section 9 of the ESA prohibits the take of any threatened or endangered species without a special permit.

After reviewing the scope, nature, and location of activities described in the Final Remedial Design Unit 10 – Warm Springs FDR, the USFWS recommended an assessment of the potential for project-related impacts to the threatened bull trout and bull trout critical habitat (USFWS 2012a). The purpose and need of this BA are to evaluate the potential effects on bull trout and on bull trout designated critical habitat resulting from: 1) implementing the selected remedy and site restoration plan (the Proposed Action) outlined in the Final RDU 10-Warm Springs FDR (USEPA-related actions) and 2) to satisfy provisions of Section 7consultation requirements for USEPA with USFWS, and USFWS intra-service consultation requirements under the ESA. The BA may also be undertaken as part of USEPA's compliance with Section 102 of the National Environmental Policy Act (NEPA), and may be incorporated into NEPA documents (USFWS 2012a).

In addition to federally-listed species, USFWS recommends that this BA assess potential project-related impacts to bald eagles, golden eagles, migratory birds, and other state species of concern that are likely to occur within the proposed project area (USFWS 2012a). USFWS does not have any site-specific information on these species, but has confirmed that breeding and non-breeding bald eagle activity occurs in the general project area along the Clark Fork River (USFWS 2012a). Both bald and golden eagles are protected by the Bald and Golden Eagle Protection Act (BGEPA), which prohibits anyone, without a permit, from taking bald or golden eagles, including their parts, nests, or eggs. The BGEPA provides criminal and civil penalties for persons found in violation, and defines take as pursue, shoot, shoot at, poison, would, kill, capture, trap, collect, molest, or disturb. "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, 1) injury to an eagle, 2) a decrease in its productivity, or 3) nest abandonment.

The consideration of potential project-related impacts to migratory birds is included in this BA due to provisions set forth in the Migratory Bird Treaty Act (MBTA). The MBTA prohibits the taking, killing, possession, and transportation (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted. To the extent practicable, construction activities should be scheduled so as not to disrupt nesting birds. If work must take place during the breeding season or at

any other time which may result in take of migratory birds, their eggs, or active nests, USFWS recommends that the project proponent take all practicable measures to avoid and minimize take.

In addition to species that fall under federal jurisdiction, USFWS has recommended this BA consider potential project-related impacts to state species of concern (USFWS 2012a). While not afforded the same legal protections as listed federally-protected species, species of concern are animals and plants native to Montana that are considered to be at risk due to declining population trends, threats to their habitats, and/or restricted distribution. Montana FWP provides county-wide lists of state species of concern and the Montana Natural Heritage Program (MTNHP) maintains a database of species of concern occurrence data. Following coordination with state and federal wildlife agencies, it was determined that this BA would consider potential impacts to state species of concern generally, and not in the same detail as required for federally-protected species mentioned in correspondence from the USFWS (USFWS 2012a).

1.4 Scope of Biological Assessment

In their October 3, 2012, letter, USFWS recommended that the USEPA or the designated lead applicant (i.e., Atlantic Richfield) assess the potential for project-related impacts to the threatened bull trout and bull trout critical habitat (USFWS 2012a).

According to guidance from USFWS, the BA would need to include the following (USFWS 2012a):

1. Description of the project
2. Description of the specific area potentially affected by the action
3. Current status, habitat use, and behavior of threatened and endangered species in the project area
4. Discussion of the methods used to determine the information in Item 3
5. Direct and indirect effects of the project to threatened and endangered species, including impacts of interrelated and interdependent actions
6. Measures that will reduce or eliminate adverse impacts to threatened and endangered species
7. Description of the expected status of threatened and endangered species in the future (short and long term) during and after project completion
8. Determination of "no effect", "may effect", "is likely to adversely affect", or "is not likely to adversely affect" for listed species
9. Determination of "is likely to jeopardize" or "is not likely to jeopardize" for proposed species or "is likely to adversely modify", or "is not likely to adversely modify" for critical habitat
10. Alternatives to the proposed action and consideration of how impacts of those alternatives on listed and proposed species would differ from the proposed action, and the reasons for not selecting those alternatives

11. Citation of literature and personal contacts used in the assessment. Avoid attributing effects determinations to species experts; effects determinations are the responsibility of the federal action agency

The scope of the BA will address all listed species and species of concern potentially found in and around the RDU 10 project areas. This will include general discussion on potential project-related impacts to the bald eagle, golden eagle, and any state species of concern found within the Warm Springs Creek watershed or within a 10-mile radius of project boundaries. This BA will discuss the likelihood that eagles and state species of concern inhabit the project area through analysis of suitable habitat, confirmed observations, frequency of observation and time passed since the last confirmed observation, species dispersal ability, and other life history traits that would factor in species' presence within the project area. However, as instructed by USFWS, detailed discussion will be limited to and focused on the bull trout and bull trout critical habitat.

This BA focuses on the potential effects on bull trout and their designated critical habitat that would result from implementing the Proposed Action along Warm Springs Creek as part of the Final RDU 10-Warm Springs FDR. This includes remediation in the Section 32 and the Lower Warm Springs Creek project areas.

Section 32

The Section 32 project area is located east of Galen Road, north of Highway 48, and terminates near the east section line. Land use in this area includes agriculture, grazing, open space, woodland, and recreational uses such as hunting. In Section 32, Warm Springs Creek flows through land owned by ARCO that previously was barren, denuded, or sparsely vegetated. In 2009-2010, ARCO completed soil stripping and treatment in the floodplain as part of the RDU 7 North Opportunity Uplands RA. Impacted soils and soils/wastes mixtures were stripped until arsenic concentrations were below the residential use human health action level. The remaining soils were then sampled for acid base account (ABA) analysis, and were treated with alkaline amendments if necessary. Organic matter was incorporated into the upper 4 inches of soil, and the soil was seeded and fertilized (CDM Smith 2012).

Within this area, Warm Springs Creek has been defined as three separate geomorphic reaches, as follows:

- Reach 32A – This Reach begins at Galen Road and extends approximately 1,000 feet downstream. Warm Springs Creek is a single, straight channel, generally incised, confined by well-vegetated berms and having a consistent, unvarying gradient without pools. It is unlikely that this reach generates additional copper load during high flow as the banks are stable and the bed is fairly well armored with large cobbles (CDM Smith 2012). Due to its stability, Reach 32A has been identified as a reference reach for the Section 32 project area.

- Reach 32B – Downstream of Reach 32A, the Creek spreads laterally, forming many small channels. This reach has no natural lateral conferment and is prone to spreading both to the north and to the south into the recently reclaimed RDU 7. The tendency to form many channels and spread laterally is enhanced by coarse sediment deposition and woody debris jams. This reach extends approximately 2,000 feet downstream (CDM Smith 2012).

- Reach 32C- This reach is characterized by having two distinct channels that convey the entire discharge during high flow. This reach begins where the multiple channels of Reach 32B coalesce into two distinct, stable channels and extends downstream nearly 3,000 feet to the airport bridge. Portions of these channels historically were reportedly dredged by the AMC to remove sediments, resulting in piles of rocky dredged materials in specific locations (CDM Smith 2012).

Lower Warm Springs Creek

The Lower Warm Springs Creek project area begins at the midpoint of Section 27 along the western boundary of the Gochanour ranch and continues downstream until terminating at the eastern boundary of Section 23 at the Johnson ranch property line. As Warm Springs Creek flows through the Anaconda-Deer Lodge County (ADLC) airport property, the extent of degradation lessens as the stream enters a sub-irrigated wet meadow. The stream channel has been disturbed to a lesser magnitude, although there are still sections of the stream that have been channelized to minimize migration into pasture, roads, and other features. Small, localized tailings deposits can be observed in several locations, particularly on the Gochanour and Johnson ranches. The volume and extent of tailings materials lessens past the Johnson ranch as the stream continues to the Clark Fork River (CDM Smith 2012).

Although the channelized reaches in this area appear stable, upstream and downstream of each channelization are numerous cutbanks representing the stream's attempt to increase its sinuosity and reduce stream power. It is this material that is likely being deposited in the waste management area (WMA) braided reach downstream. Along channelized reaches, several of the historic channels can still be identified. Land use in this reach is primarily agricultural with very little or no forested riparian buffer along the right bank. Along the left bank, open areas are interspersed with narrow forested tracts (CDM Smith 2012).

However, the geographic action area of this BA extends beyond the boundaries of proposed remediation areas for a couple of reasons. First, the remedial benefits and potential short-term adverse effects from implementing the Proposed Action would not be limited to just Section 32 and Lower Warm Springs Creek. They would extend to aquatic life in Warm Springs Creek downstream of the remediation areas. Second, the remediation may result in easier movement upstream for bull trout and other aquatic life.

The BA will include an environmental baseline describing existing conditions within the action area. Watershed characteristics of Warm Springs Creek will be addressed, with particular attention devoted to reaches within and adjacent to the project area. Discussion will also include an overview of bull trout distribution, population status, life history characteristics, limiting factors, and habitat requirements. In addition, key components of the proposed action will be addressed, such as a description of remediation activities, bull trout conservation measures, and monitoring responsibilities.

Discussions of environmental baseline conditions presented in this BA reflect the cumulative effect of all actions that have occurred in the past, plus those actions occurring now or anticipated to occur in the very near future prior to implementing the Proposed Action. These include direct and indirect effects on bull trout and their habitat resulting from the past and present impacts of all federal, state, and private actions and other activities in the geographic action area; anticipated effects of proposed

federal projects in the geographic action area for this BA where Section 7 consultation has already occurred; and the effects of concurrent state or private actions.

Once existing conditions with the action area have been described, the BA will utilize the Crosswalk Analysis between the Bull Trout Matrix Pathways and Indicators (MPIs) and Primary Constituent Elements (PCEs) of Proposed Critical Habitat outlined in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS 1998a). This analysis assists in facilitating and standardizing determinations of effects for bull trout. Slight modifications to the analysis may be made due to limitations of existing data for the action area. Continued coordination and input from USFWS and Montana FWP throughout completion of the analysis is expected.

The Crosswalk Analysis between the MPIs and the PCEs will assist in determining the effects of the Proposed Action. Detailed discussion will focus on short-term direct and indirect effects, long-term direct and indirect effects, cumulative effects, and conservation actions. Effects of the Proposed Action will be considered not only for bull trout, but for other impacted federally-protected species, state species of concern, and bull trout critical habitat.

Based on the identification of effects of the Proposed Action, a determination of effects will be made for bull trout, bull trout critical habitat, and other affected species. This will include documentation of expected incidental take.

1.5 Methods

The purpose of this BA is to evaluate the potential effects on bull trout, bull trout designated critical habitat, and other federally-protected or state species of concern resulting from implementation of the selected remedy and site restoration plan (i.e., the Proposed Action) outlined in the Final RDU 10-Warm Springs FDR. In order to evaluate potential effects of the Proposed Action, an environmental baseline describing existing conditions within the project area is needed. Existing conditions within the project area are determined by conducting a review of all available literature and through coordination with state and federal agencies. The literature review is then supplemented by observations in the field.

The goal was to perform a literature review and provide an inventory of natural resources within the Warm Springs Creek watershed, including the designated project area, RDU 10 – Warm Springs Creek. Documents pertaining to the natural resources and ecology of the Warm Springs Creek project area were collected, evaluated, and summarized. The literature included letters, reports, studies, maps, figures, and tables regarding the ecology of Warm Springs Creek and associated habitats, and the status, distribution, and life history requirements of bull trout, additional federally-protected species, as well as other state species that may be of concern, from the following sources:

- USFWS
- USEPA
- National Park Service (NPS) – Bull Trout BA: Gant-Kohrs National Historic Site
- Montana FWP

- MTNHP – Natural Heritage Database
- U.S. Geological Survey (USGS) including topographic maps
- Natural Resources Conservation Service (NRCS) including soil maps, and
- Other state and federal agencies as appropriate

Seven sources from state and federal agencies and private consultants in particular were essential to the evaluations and determinations made within this BA. The October 3, 2012, letter from the USFWS (USFWS 2012a), not only initiated the composition of this BA but provided specific information regarding the evaluation of features essential to the conservation of the bull trout. Excerpts of this information are provided below:

"Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993, p. 4). Habitat components that particularly influence their distribution and abundance include water temperature, cover, channel form and stability, spawning and rearing substrate conditions, and migratory corridors (Fraley and Shepard 1989, p. 138; Goetz 1989, p. 19; Watson and Hillman 1997, p. 247). Large patches of these components are necessary to support robust populations. The Service has defined a set of physical or biological features essential to the conservation of bull trout and may require special management consideration or protection. These features are the PCEs laid out in the appropriate quantity and spatial arrangement for the conservation of the species (bull trout).

The Service supports efforts that allow for the PCEs to become functionally established. Removal of COCs from the floodplain is an important step for improving bull trout habitat and PCE function. In addition, the Service supports the use of soft engineering approaches and efforts that allow the stream channel to move across the floodplain. Connected floodplains allow for the renewal of physical and biological interactions that support complex aquatic habitats important to bull trout."

The second source consists of documents associated with the Grant-Kohrs National Historic Site. This site is located downstream of Warm Springs Creek on the Clark Fork River in Deer Lodge, Montana. Of particular importance is the *Northern Rocky Mountains Invasive Plant Management Plan / Environmental Assessment*. This document includes a BA on bull trout, which provides information on bull trout life history and biology (NPS 2011).

The third source consists of state species of concern lists and occurrence data provided by MTNHP. The MTNHP maintains a statewide database of all federally-listed species and state species of concern. This database was consulted to provide occurrence locations of animal and plant species within or adjacent to the Section 32 and Lower Warm Springs Creek project areas. The potential impact to MTNHP-identified plants and animals with confirmed observations within the Warm Springs Creek watershed or within a ten-mile radius of project area boundaries are addressed within this BA.

The fourth source is the USFWS Bull Trout 5-year Review Summary and Evaluation, completed April 25, 2008. While this report touches on bull trout biology and habitat, it focuses largely on threats, conservation measures, and regulatory mechanisms. In particular, the five-factor threats assessment addresses the risk to bull trout from habitat modification, overutilization, disease or predation, inadequate regulations, and other factors affecting its continued existence. This information was used in this BA to evaluate potential impacts to bull trout from the Proposed Action and to describe the future status of the Warm Springs Creek subpopulation of bull trout during and after project completion.

Several important sources are studies by private consultants that assess impacts to bull trout and characterize Warm Springs Creek. The *Biological Assessment of the Milltown Reservoir Sediments Operable Unit Revised Proposed Plan and of the Surrender Application for the Milltown Hydroelectric Project (FERC No. 2543),* prepared by CH2M HILL and The Clark Fork and Blackfoot, L.L.C., contains extensive technical information that has been reviewed by the USFWS (CH2M 2004). The information provided in this document constitutes a very important component of the present BA because: 1) it covers areas within the same drainage basin; 2) it provides background information on the status and characteristics of bull trout and their habitat in action area drainages; and 3) it discusses the past, present, and future effects of non-contaminant factors on bull trout populations and habitat.

The *Draft Warm Springs Creek Site Characterization Report* (CDM 1999) is an assessment of the hydrology, geomorphology, aquatic habitat, and disturbances of Warm Springs Creek within the project area. Also included in this report were detailed descriptions of soil conditions, Rosgen stream classification, and overall stream characterization. Since the scope of this BA did not include a formal field stream assessment, this report was essential to describing the existing conditions of Warm Springs Creek within the project area.

This BA draws upon the remediation activities described in the *Final RDU 10 Warm Springs Creek, Final Design Report* to define the Proposed Action. This document was prepared by CDM Smith (2012) at the request of USEPA and includes information on the Anaconda Smelter NPL Site, Section 32 and Lower Warm Springs Creek project areas, threatened and endangered species, stream morphology, water quality, and remedial design. Conceptual remedial designs for the Section 32 and Lower Warm Springs project (i.e., remediation) areas have been prepared by TREC, Inc. and ARCO.

In addition to sources obtained from federal and state agencies, information on bull trout and other species addressed within this BA was obtained from academia and non-governmental organizations. Of particular importance to the completion of this BA were the following sources:

- Fraley, J.J., and B.B. Shepard. 1989. Life history, ecology and population status of migratory bull trout (Salvelinus confluentus) in the Flathead Lake and River system, Montana. Northwest Science 63(4):133-143.
- Goetz, F. 1989. Biology of the bull trout, Salvelinus confluentus, literature review. U.S. Forest Service, Willamette National Forest, Eugene, Oregon.
- NatureServe. 2011. *NatureServe Explorer: An Online Encyclopedia of Life*. Version 7.1. NatureServe, Arlington, Virginia, http://www.natureserve.org/explorer/
- Rieman, B. E. and J. D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. GTR-INT-302. U.S. Forest Service, Boise, Idaho.
- Schreck, W., Kreiner, R., Liermann, B., and Lindstrom. 2011. An Inventory of Irrigation Structures in the Upper Clark Fork River Drainage, Montana. Montana Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service.
- Watson, G. and T. Hillman. 1997. Factors affecting the distribution and abundance of bull trout: an investigation into hierarchical scales. North American Journal of Fisheries Management 17:237-252.

Remedial designs, construction methods, remediation techniques, and environmental protection measures are described (Section 2) and analyzed (Section 4) to determine potential impacts to bull trout (Section 5) and other identified species of concern. The effects analysis section clearly reflects how baseline habitat and baseline population conditions would change when the Proposed Action is implemented. In addition, an analysis of the No Action Alternative will be conducted to determine how impacts on listed species would differ from the proposed action, and the reasons for not selecting the No Action Alternative. The effects of the Proposed Action will include short-term direct and indirect effects, long-term direct and indirect effects, and cumulative effects. Conservation actions and mitigation measures to minimize potential impacts on bull trout and other identified species of concern will also be discussed. For bull trout, conservation actions and mitigation measures will draw heavily from the USFWS Bull Trout Draft Recovery Plan (USFWS 2002).

As part of the effects analysis, the USFWS has recommended that a crosswalk analysis between the Bull Trout MPIs and PCEs of Proposed Critical Habitat be included in this BA (USFWS 2012a). This crosswalk analysis describes the level to which bull trout critical habitat will be affected by the Proposed Action by analyzing how the action would affect the nine PCEs. The nine PCEs include:

1. Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity and provide thermal refugia

2. Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.

5. Water temperatures ranging from 2 to 15°C (36 to 59°F), with adequate thermal refugia available for temperatures at the upper end of this range

6. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., < 12 percent) of fine substrates less than 0.85 mm in diameter and embeddedness of these fines in larger substrates are characteristic of these conditions

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited

9. Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present

The crosswalk analysis utilizes 19 habitat MPIs for bull trout to evaluate and document baseline conditions and to aid in determining whether a project is likely to adversely affect or result in the

incidental take of bull trout (USFWS 2013a). The MPIs are analyzed for each of the nine PCEs to determine which indicators are relevant to each of the PCEs. The 19 habitat MPIs include:

Water Quality

1. Temperature
2. Sediment
3. Chemical Contaminants and Nutrients

Habitat Access

4. Physical Barriers

Habitat Elements

5. Substrate Embeddedness
6. Large Woody Debris
7. Pool Frequency and Quality
8. Large Pools
9. Off-channel Habitat
10. Refugia

Channel Conditions and Dynamics

11. Wetted Width/Maximum Depth Ratio
12. Streambank Condition
13. Floodplain Connectivity

Flow/Hydrology

14. Changes in Peak/Base Flows
15. Drainage Network Increase

Watershed Conditions

16. Road Density and Location
17. Disturbance History
18. Riparian Conservation Areas
19. Disturbance Regime

A completed crosswalk analysis should show that each PCE has been analyzed and should document the effect of the PCE that corresponds to each habitat parameter. Slight modifications to the crosswalk analysis may be made due to site-specific conditions and limitations of existing data for the action areas. Continued coordination and input from USFWS and Montana FWP throughout completion of the analysis is expected.

The analysis of effects of the proposed action on bull trout, bull trout critical habitat, and other species of concern justifies the determination of effect. The dichotomous key provided in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* will be consulted during the effects determination process (USFWS 1998a). The level of detail and supporting evidence and rationale are critical to

supporting a correct effects determination. This BA will contain a distinct statement of only one effect of the project for each affected species and critical habitat. Therefore, one effect determination is provided for bull trout, each species of concern, and bull trout critical habitat. In this section, at minimum, one of the following statements will be used:

- No effect
- May affect, not likely to adversely affect, **or**
- May affect, likely to adversely affect

If incidental take of bull trout is anticipated, the *Framework* will assist in defining how the Proposed Action would result in incidental take, the duration of the take, as well as the affected life stage(s) and life form(s) (USFWS 1998a).

It is important to note that some projects, including remediation activities associated with the Proposed Action, have short-term adverse effects during construction, but result in long-term benefits. In such a case, the effect determination of the proposed remediation project is may affect, likely to adversely affect. If a no effect determination is made, it should be clearly stated. Regardless of determination, this document should be included in the administrative record.

1.6 Consultation

As noted in *Section 1.2, Purpose and Need for Biological Assessment,* this BA is intended to satisfy provisions of Section 7 consultation requirements for USEPA with the USFWS, and USFWS intra-service consultation requirements under the ESA. Other agencies expected to provide input other than USFWS include Montana FWP and the Montana Department of Environmental Quality (DEQ). The MTNHP was also consulted to obtain rare, threatened, and endangered species occurrence data.

The PRP, ARCO, will also be consulted, particularly when it comes to requests for site-specific information, site access, and remediation design, construction practices, and monitoring responsibilities. Where action-specific updates are necessary, USEPA will consult with the USFWS on the effects to bull trout and proposed designated critical habitat resulting from site remediation activities throughout the design and construction process. The USFWS will determine if re-initiation of formal consultation is necessary on a case-specific basis.

Section 2

Project Description – Description of the Action and the Action Areas

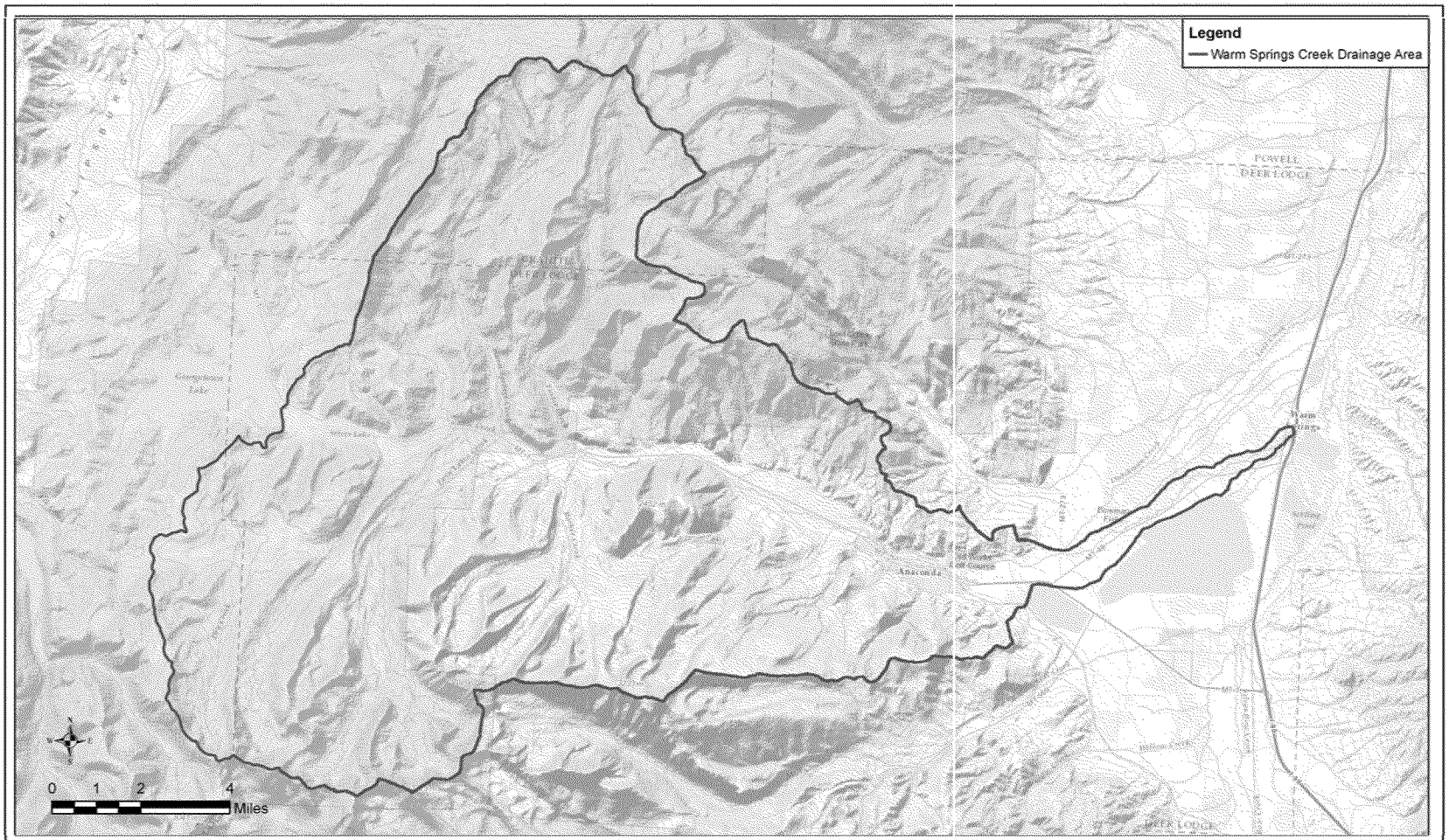
2.1 Key Components of the Proposed Action

The Warm Springs Creek project areas are located east of Anaconda, Montana, east of Galen Road, and parallel the area north of Highway 48 to its entry onto the 100-year floodplain of the Clark Fork River. In addition to widespread aerial contamination, fluvial transport of mine wastes associated with past smelting operations has resulted in sediments containing elevated levels of contaminants of concern (COCs) including arsenic, lead, cadmium, copper, and zinc within the Warm Springs Creek floodplain (Atlantic Richfield 2013).

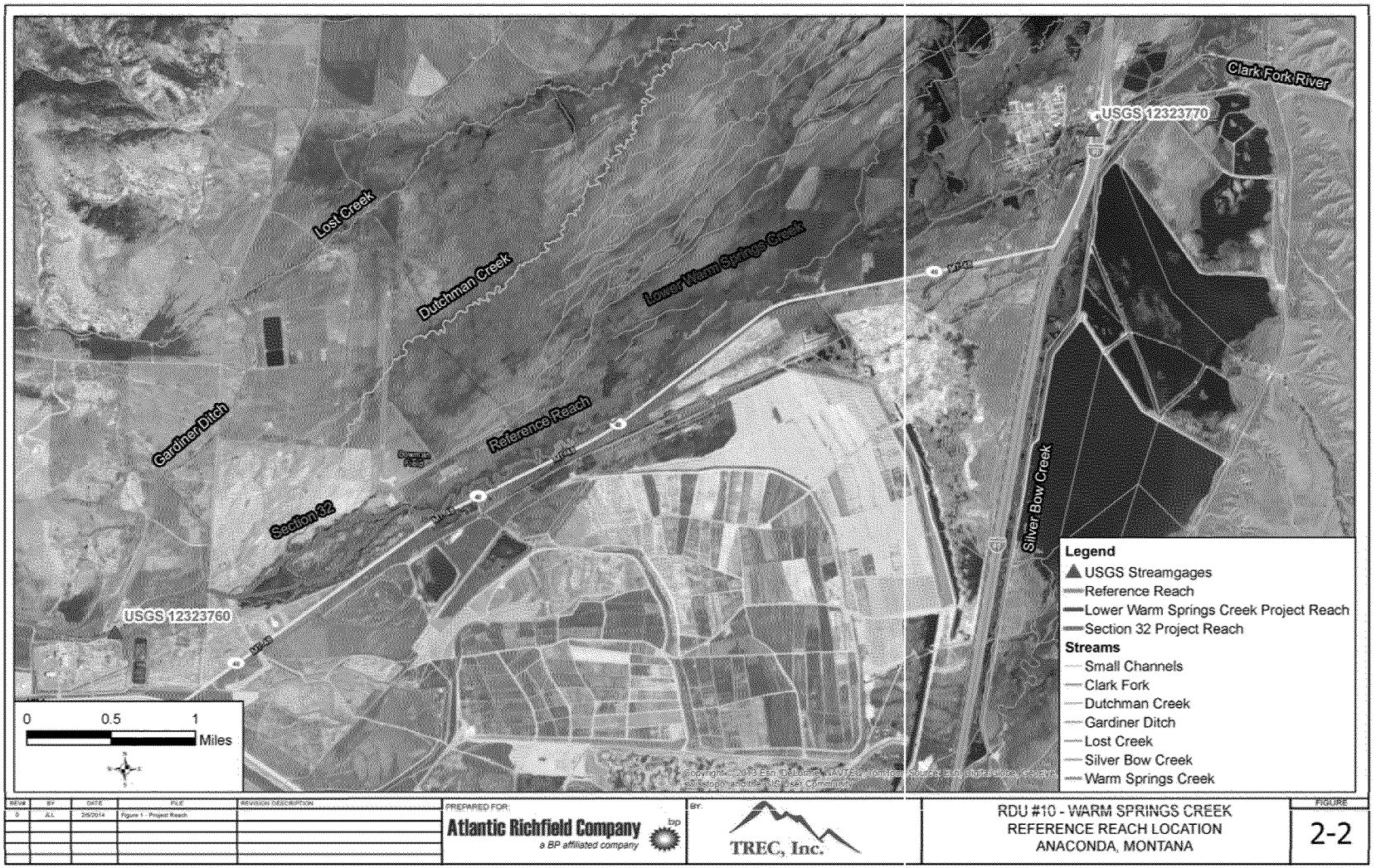
The Remedial Design Unit (RDU) #10 Warm Springs Creek Drainage Area is depicted on **Figure 2-1**. Warm Springs Creek consists of two distinct project areas. **Figure 2-2** shows these two areas along with the Lower Warm Springs Creek Reference Reach, Gardiner Ditch, Lost Creek, and Dutchman Creek. The westernmost area, designated as the Section 32 Project Area, extends from Galen Road to the Anaconda-Deer Lodge County (ADLC) airport. The density of vegetation within this area is variable, with more upland portions of the floodplain being sparsely vegetated, and vegetation more abundant in areas close to the stream channel. The second area, designated the Lower Warm Springs Creek Project Area, is located primarily on the Gochanour and Johnson Ranches east of the ADLC airport. Although the soils in this area have elevated concentrations of COCs, the Lower Warm Springs Creek Project Area is well-vegetated due to sub-irrigation from the relatively shallow ground water table.

The Anaconda Regional Water, Waste, and Soils Operable Unit (ARWW&S OU) Record of Decision (ROD) specifically identified Warm Springs Creek under the Surface Water Remedy portion of the Selected Remedy. This remedy also addressed wastes within the floodplain. In addition to the surface water remedy, the soils remedy of the ROD also applies to the Warm Springs Creek project (CDM Smith 2012). With regard to the Selected Remedy, surface water quality is of the primary concern for bull trout. The Selected Remedy and Remedial Action Goals and Objectives (RAOs) for Surface Water as presented in the ROD (USEPA 1998) are as follows:

Periodic exceedances of water quality standards within the ARWW&S OU are caused by surface water runoff from aerially contaminated soils and from areas of evaporative salts, erosion of fluvially deposited tailings into receiving water bodies, and contaminated ground water discharges into perennial flow drainages. In order to meet the remedial action objectives, EPA and Montana Department of Environmental Quality (DEQ) will require reclamation of contaminated soils, engineered storm water management options to control overland runoff, and other engineering controls to minimize releases from fluvially deposited tailings.



CDM Smith



Specific remedial action objectives of the Selected Remedy will be to achieve the following:

Section 4 Selected RAOs:

- Minimize source contamination to surface waters that would result in exceedances of State of Montana water quality standards.
- Return surface water to its beneficial use by reducing loading sources of COCs.

In addition to the RAOs, the Selected Remedy for surface water contains the following remedial requirements specific to Warm Springs Creek:

Human actions on Warm Springs Creek (e.g., channelization, relocation, historic mine waste disposal and flow alteration) have resulted in reaches of the channel being unstable with increasing lateral movement and down cutting. Remedial actions (RAs) are necessary to protect erosion control structures within the OW/EADA OU and to minimize rates of release of COCs found in aerially contaminated riparian soils and fluvial deposited tailings. The Selected Remedy for Warm Springs Creek will:

1. *Minimize erosion of fluvial deposited tailings using selective removal and stream stabilization techniques;*
2. *Remove identified waste material located on the RSN Johnson ranch and consolidate into a WMA;*
3. *Selectively remove other waste materials within the unstable portion of the stream and consolidate into a WMA;*
4. *Replace removed wastes with material of acceptable quality; and,*
5. *Employ stream stabilization techniques such rechannelization, gradient controls and stream bank re-enforcement to minimize future migration of the stream into adjacent fluvial deposited tailings and to protect waste caps and erosion control structures implemented in the OW/EADA OU, in accordance with applicable or relevant and appropriate requirements ARARs. Waste material outside the unstable portion will be revegetated to reduce runoff.*

The 2011 ARWW&S OU ROD Amendment (USEPA and MDEQ 2011) identified the following significant changes to the 1998 requirements for Warm Springs Creek:

- *Although the 1998 ROD required that the erosion of fluvially-deposited tailings be minimized through selective removal and stream stabilization, only 1,200 cubic yard (CY) of tailings, at the RSN Johnson Ranch, were identified for removal. Several remedial design (RD) investigations, including 1999 base and high flow synoptic surface water sampling, Riparian Evaluation System evaluations of stream bank condition, and extensive soil/waste sampling conducted in 2001, 2004 and 2005 have led to RAs now being required in two specific areas along Warm Springs Creek (the Section 32 area and the Gochanour/Johnson Ranches area).*

- *This ROD Amendment includes the two specific Warm Springs Creek areas shown on Figure 5-1. Since the 2005 investigations in the Section 32 area, Atlantic Richfield has completed waste removal in the Warm Springs Creek floodplain under the North Opportunity RA. Approximately 100,000 CY of soil and soil/waste mixed material were removed and transported to the Opportunity Ponds WMA in 2009 and 2010 for disposal. The underlying soil has been treated, amended, seeded, and fertilized. This completed waste removal leaves only minor amounts of waste removal along the stream corridor for the Section 32 reach.*

- *Design elements for Warm Springs Creek Floodplain include the removal of wastes and soils/waste mixtures from the floodplain, transport of these contaminated materials to the Opportunity Ponds WMA for disposal, stream bank stabilization, treatment, and backfill, if necessary, of the waste removal areas. An estimated 40,000 CY of soil/waste removal is identified for Lower Warm Springs Creek project area within the area shown in Figure 5-1.*

2.1.1 Proposed Design including Material Removal

The Remedial Action Work Plan (RAWP) provides comprehensive documentation for the methods and procedures that would be followed for the implementation and management of the ARWW&S OU RA for RDU 10- Warm Springs Creek (Atlantic Richfield 2013).

This RAWP sets forth task-specific methods or approaches, schedules, and other provisions to comply with performance standards and other criteria required by the ROD (EPA and MDEQ, 1998) and 2011 ROD Amendment (EPA & MDEQ 2011) as well as those identified in the Warm Springs Creek Final Design Report (FDR) (CDM Smith 2012).

The specific design for Warm Springs Creek is included in two documents, the FDR (CDM Smith 2012) and the RAWP for RDU 10 (Atlantic Richfield 2013). These documents include comprehensive details with regard to the proposed action and are referenced throughout this BA. The RAWP presents a detailed design and plan for implementing the RA that meets the remedial requirements identified in the FDR.

2.1.1.1 Section 32

The proposed design for the Section 32 Project Area (**Figures 2-2, 2-3, 2-4, and 2-5**) includes:

1. The Installation of one temporary stream crossing [see TREC memo on temporary stream crossings (TREC 2014)] (**Figure 2-4**)
2. The Installation of four lateral Flow Control Berms (**Figures 2-4 and 2-5**)
3. Channel Reconstruction (**Figure 2-5**)
4. Reactivation of the historical channel through the alluvial fan area with a capacity of approximately the two years storm event (405 cubic feet per second) (**Figure 2-5**). Specific items included in the reactivation include:
   - Removal of debris and surface fine sediments to a depth of 6 to 24 inches
   - Processing of the excavated material
   - Cobbles and other clean, native substrate will be saved

- Clean, native substrate will be placed into the reconstructed channel in a composition similar to that documented in pebble counts

5. Removal of the existing berm (otherwise known as the "Nike" berm) that currently is located between the north and south channels and on the island of Section 32 (**Figure 2-4**)

The purpose of Section 32 remediation is to remove contaminated sediments and to create a clean, stable channel and a broad floodplain which the stream can access during 5-year flood events. Where a defined stream bank exists, remediation activities aim to protect the existing bank. For degraded banks, remediation activities would ensure that reconstructed banks tie-in to the existing grade of the defined bank.

No in-stream work would occur below the braided section of the project area; however, this area would see contaminant removal activities in spot locations no closer than 20 feet from the top of bank. No remedial activities are planned between the confluence of the north and south channels and the airport road bridge.

The removal of material from Section 32 includes the removal of visible tailings and high contamination areas, the debris jam (i.e., fence, woody debris), the existing berm, and material from the depositional area (**Figures 2-4 and 2-5**). The proposed action will also greatly alter the existing 100 year floodplain. Areas to the south of Highway 48 would no longer be considered within the 100 year floodplain. Large areas to the north and adjacent the airport, would also no longer be considered within the 100 year floodplain. More water would also be available within the main channel of Warm Springs Creek. The changes in the floodplain as a result of the proposed action are depicted on **Figure 2-6**.

The proposed design incorporates the "four Cs" or four primary habitat requirements for bull trout. These entail clean substrate composition that includes free interstitial spaces; complex cover including large woody debris, undercut banks, boulders, shade, pools, or deeper water; cold water temperatures; and connected habitats through migratory corridors. Additional details on the "four Cs" are provided in Section 3.2.4.